

**IN THE CLAIMS:**

1 1.-4. (Cancelled)

1 5. (Previously Presented) A method of determining resistance in a fuel cell compris-  
2 ing the steps of:

3 (A) providing a DC-DC converter with an associated microcontroller;

4 (B) adjusting input parameters of said DC-DC converter, using said microcon-  
5 troller, to establish an initial duty cycle;

6 (C) reading a stack voltage and the stack current;

7 (D) changing the duty cycle;

8 (E) substantially immediately measuring the fuel cell voltage and fuel cell cur-  
9 rent; and

10 (F) calculating resistance based upon measurements.

1 6. (Previously Presented) The method of determining resistance, as defined in claim  
2 5 comprising the further step of:

3 evaluating any changes in resistance over time as a measure of fuel cell hydration.

1 7. (Previously Presented) The method of determining resistance, as defined in claim  
2 5, wherein said fuel cell comprises one of the following:

3 (A) a fuel cell stack;

4 (B) a fuel cell array; and

5 (C) an individual fuel cell.

1 8. (Previously Presented) The method of determining resistance, as defined in claim  
2 7, wherein a fuel cell in said fuel cell stack, said fuel cell array, or said individual fuel  
3 cell is a direct oxidation fuel cell.

1 9. (Previously Presented) The method of determining resistance, as defined in claim  
2 8, wherein said direct oxidation fuel cell is a direct methanol fuel cell.

1 10. (Previously Presented) The method of determining resistance, as defined in claim  
2 7, wherein a fuel cell in said fuel cell stack, said fuel cell array, or said individual fuel  
3 cell is a hydrogen fuel cell.

1 11.-15.(Cancelled)

1 16. (Original) A method of measuring resistance across a direct oxidation fuel cell  
2 stack that includes programmable DC-DC switches including the steps of:

3 (A) using said programmable DC-DC switches to switch a load on and off said  
4 fuel cell stack;

5 (B) signaling an associated microprocessor under pulse-width modulation con-  
6 trol to adjust the duty cycle of said DC-DC switches;

7 (C) measuring voltage changes as said switches change;

8 (D) calculating a change in resistance over time; and

9 (E) predicting cell hydration based upon said changes.

1 17. (Cancelled)